

## **Plumbing Apprenticeship Year 1**

Idaho State Division of Professional Technical Education  
Revised June 2011

### **Total Suggested Hours - 168**

Each of the following subjects may take more or less time than is shown, but a minimum of 144 hours is required.

### **Suggested Materials:**

- 30/60/90 degree angle
- Calculator (Home Project Calc or one that will add feet & inches)
- Architect Ruler
- Metal Tape Measurer -any size

**Optional:** T – Square (CWI provides)

### **Suggested Textbooks:**

1. Uniform Plumbing Code 2003 Illustrated Training Manual, ISBN 1081-3802.  
Web site: <http://www.iapmo.org>; Email address: [iapmo@iapmo.org](mailto:iapmo@iapmo.org)
2. Residential Construction Academy Plumbing Book, ISBN -1-4018-4891-5;  
Web site: [www.delmarlearning.com](http://www.delmarlearning.com)
3. Mathematics for Plumbers & Pipe Fitters, Delmar, ISBN -1-4283-0461-4
4. Current Copy of Idaho Code & Administrative Rules Pamphlet. Students may print it at [www.Dbs.idaho.gov](http://www.Dbs.idaho.gov).

### **Instructions:**

This outline is organized by subjects. Each subject should be broken down into lessons. It may be more effective if the instructor combines a portion of each subject area together into a lesson. For example, you might break a three hour lesson into three one-hour sections, one hour on Safety, one hour on Math, and one hour on Codes. The instructor should concentrate on the student achieving the basic objectives stated. Suggested methods of instruction are lectures, worksheets, water and drainage drawings, power point presentations, and lab activities. At the end of each lesson the student should be quizzed and/or graded on his knowledge.

### **Introduction to the Plumbing Profession - 6 hours**

- History of the Plumbing Profession
- Idaho State Plumbing Structure
- Basic Principles of Plumbing

#### ***Objectives:***

- Describe the history of the plumbing profession
- Identify the state of Idaho's organizational structure
- Identify the basic principles on which the plumbing code is based

## **Plumbing Safety – 18 hours**

- Basic Safety
- OSHA
- Lifting
- Ladder
- Fire
- Personal Protective Equipment
- Trench
- Lock out /tag out
- Confined Space

### ***Objectives:***

- Understand common unsafe acts and conditions that cause accidents and how to handle these situations to make them safer
- Identify job site hazards – work specific to plumbers
- Learn how to maintain your workplace safely
- Understand OSHA's involvement in the plumbing profession
- Understand how the cost of accidents and illnesses effect everyone on a job site
- Identify how to properly lift heavy objects to avoid injury
- Identify the proper procedures to safely work on and around ladders
- Identify the different types of fires and the proper extinguisher to use for each type
- Identify the types of personal protective equipment needed in the plumbing profession and when each type is required
- Understand how to work safely in and around a trench
- Understand the lock out/ tag out procedure
- Understand how to properly work in and around a confined space

## **Introduction into Hand Tools used in the Plumbing Profession - 6 hours**

- Levels
- Tape Measure
- Screw Drivers
- Wrenches
- Plastic Pipe Cutter
- Saws
- Pliers
- Torch regulator assembly

### ***Objectives:***

- Identify the types of hand tools used in the plumbing profession
- Learn how to properly use and care for basic hand tools
- Visually inspect hand tools to determine if they are safe to use
- Identify the types of personal protective equipment required to be used with hand tools

## **Introduction into Power Tools used in the Plumbing Profession – 6 hours**

- Power Drills
- Drill Bits
- Power Saws
- Air Compressor
- Pneumatic Tools

- Jack Hammers

***Objectives:***

- Identify the types of power tools used in the plumbing profession
- Learn how to properly use and care for basic power tools
- Identify which drill or saw is used relevant to the work location
- Identify which drill bit or saw blade is used relevant to a system installation
- Visually inspect power tools to determine if they are safe to use
- Identify the types of personal protective equipment required to be used with power tools

**Identification of All Plumbing Fittings and Types of Pipe - 6 hours**

***Objectives:***

- Identify and describe the various fittings used in the plumbing profession
- Understand that certain fitting materials and designs may only be used for specific systems
- Describe the relationship of fitting design selections and plumbing codes
- Identify and describe common types of pipes used in the plumbing profession
- Understand that certain types of pipes may only be used for specific systems
- Describe the relationship of pipe design selections and plumbing codes

**Mathematics – 30 hours**

- Review of Basic Math Fundamentals
- Area
- Volume
- Weight/Gallons of liquids

***Objectives:***

- Define the kinds of measurements used
- Demonstrate how to use a calculator to solve plumbing math
- Define the basic concepts to solve story problems.
- Demonstrate the use of a standard ruler and tape measure
- Recognize some of the basic shapes used in the plumbing industry and demonstrate basic geometry to measure them
- Solve problems for area and volume using appropriate formulas.
- Solve problems relating to area, volume, weights and gallons

**Introduction to the Uniform Plumbing Code – 39 hours**

- General Regulations
- Water System
- Drain, Waste and Vent System

***Objectives:***

- Apply general regulations related to water systems and drain, waste and vent systems
- Perform water pipe sizing exercises
- Describe the code requirements for the installation of water supply and distribution systems (materials, joints, connections, sizing, etc)
- Describe the code requirements for the installation of drain and waste systems (materials, joints, connections, sizing, etc)
- Perform drain and waste pipe sizing exercises

**Isometric Drawings – 15 hours**

- Plumbing Symbols and Abbreviations
- Three dimensional drawing

***Objectives:***

- Identify the various plumbing symbols and abbreviations used on a blueprint drawing

**Lab – 42 hours -** For those schools with a lab, these hours may be completed entirely in a lab setting. For those who do not, the instructor should make every attempt to use a company's space & equipment or the instructors may explain through lecture and demonstration.

- Plumbing Repairs and Troubleshooting
- Plumbing lay out for single bathroom group

***Objectives:***

- Identify and repair various plumbing fixtures needed in a bathroom group
- Given a plan view of a bathroom group, demonstrate the following:
  - Create an isometric drawing
  - Lay out the bathroom group in the lab
  - Plumb the bathroom group using fittings and piping to minimum standards of the UPC